

## **Pre-Beach/Pre-Presentation Lesson Plan I**

**Grade Level:** K-6

**Length of lesson:** ~90-110 min

**Content Standards:** (All elementary Standards listed at end of Lesson plan)

### **Learner Background:**

Students have not had horseshoe crab lecture or beach visit. This is an introductory lesson to horseshoe crabs.

### **Student Learning Objective(s)**

Students will be able to understand horseshoe crabs are important to other species and to humans. Students will be able to write about what makes horseshoe crabs so special and different.

### **Assessment:**

Students will create a letter from a horseshoe crab to a human (persuasive argument) about why horseshoe crabs should be protected.

### **Materials/Resources:**

“Crash: A Tale of Two Species” movie, tv/computer, paper, pencils.

**Learning Activities:** Whole class for initiation/movie, individual for writing letter and whole class for presentation.

**Initiation:** Watch PBS NATURE “Crash: A Tale of Two Species” (~50min) and have a quick discussion. <http://www.pbs.org/wnet/nature/episodes/crash-a-tale-of-two-species/video-full-episode/4772/>

**Lesson Development:** Once the movie and discussion is finished, students will write a letter to a person (mayor, president, fishing company, horseshoe crab harvester, cousin and so on) as to why the horseshoe crab is so important to humans and the world and why they should be protected. This letter should include the medical and ecological impacts that horseshoe crabs have (these are mentioned in the movie). (~30 minutes)

### **Closure:**

Students will do a 3-2-1. (3 things learned, 2 questions, and 1 interesting thing you found)

## Pre-Beach/Pre-Presentation Lesson Plan II

**Grade Level** K-6

**Length of lesson** ~120 minutes

**Content Standards:** Standards listed at end of lesson plan.

**Learner Background:** Students have not learned about horseshoe crabs before in school. Students may have a basic understanding of biology and science. This lesson can be before or after science units; this lesson is before a beach visit or presentation by Project *Limulus*

**Student Learning Objective(s):** Students will be able to explain why the horseshoe crabs are important to other species and especially to humans. Students will be able to explain the different parts of the horseshoe crab and be able to make a labeled diagram.

**Assessment:** Horseshoe crab cutout/labeling, and presentation.

**Materials/Resources:** Paper, scissors, tape, crayons/colored pencils, paper fastener, (wobbly eyes in wanted)

**Learning Activities:** Whole class instruction for movie. Individual for horseshoe crab creation/labeling.

**Initiation:** “Crash: A Tale of Two Species” movie and a small discussion (~60min)

**Lesson Development:** After the movie, students will be given art supplies and will create their own horseshoe crab. The crabs have to be colored in and the different body parts have to be labeled for full credit. Teacher has students create outline and then cut it out to create diagram. (~45 min)

**Closure:** Students will stand up and present their horseshoe crab to the class. The teacher can ask which parts are which when the students are up presenting for informal assessment. (~10 min)



## **Post-Beach/Post-Presentation Lesson Plan**

**Grade Level:** K-6

**Length of lesson:** ~60-90min

**Content Standards:** (All elementary Standards listed at end of Lesson plan)

### **Learner Background:**

Students have had a horseshoe crab lecture or beach visit. Students have knowledge of Project *Limulus* and horseshoe crab research. Students have measured and tagged horseshoe crabs.

### **Student Learning Objective(s)**

Students will be able to analyze the data they gathered from a beach visit or given by Project *Limulus*.

Students will be able to create a bar graph of: # of horseshoe crabs, male/female, average sizes and shell quality.

Students will present their graphs and information that they have found.

### **Assessment:**

Students will, in groups, be assigned a certain amount of information and turn that data into bar graphs and tables. These groups will then present their data.

### **Materials/Resources:**

Markers/colored pencils, pencils, graphing paper, horseshoe crab data

**Learning Activities:** Whole class for initiation, small group for activity creation, and then whole class presentation at the end.

**Initiation:** If not same day as lecture/beach: Have students write about how their experience was and what they learned from the lecture/beach. If same day as lecture/beach: Go straight into activity

**Lesson Development:** Students will work in small groups and take information from the beach and create bar graphs to compare data. Data can range from amount of males vs. females at a beach, the size of crabs and how many, and so on. Once the graphs are complete students will color them in and present them into the class. (If high enough cognizant level, students can explain why this is important, if not teach or lecturer can help out.)

### **Closure:**

**Part 1:** Ask students what we can do to help increase the horseshoe crab population.

Option: If a problem has been seen in the data or have found an anomaly in data, can ask students how it can be fixed.

**Part 2:** Have students write down what they learned from the lecture/beach research and how their experience was

**For More Information go to:**

**[Projectlimulus.org](http://Projectlimulus.org) or contact us [info@projectlimulus.org](mailto:info@projectlimulus.org)**

### **Supplemental information**

<http://www.ceoe.udel.edu/horseshoecrab/>

Good website provided by NOAA and Sea grant

<http://www.marine.usf.edu/pjoccean/packets/f01/f01u5p3.pdf>

What is a Horseshoe crab by Project Oceanography

<http://www.fws.gov/northeast/pdf/horseshoe.fs.pdf>

Introductory information on horseshoe crabs provide by the U.S. Fish and Wildlife Service

<http://www.dnr.state.md.us/education/horseshoecrab/>

Information on horseshoe crabs provided by the Maryland Department of Natural Resources

<http://www.pbs.org/wnet/nature/episodes/crash-a-tale-of-two-species/introduction/592/>

Video explaining the connections of horseshoe crabs and the migratory shore bird the Red Knot in DE Bay, provided by NATURE and PBS, includes full video, teacher guide, etc.

<http://www.exploringnature.org/db/detail.php?dbID=45&detID=2671>

Blank and labeled horseshoe crab picture



**2004 Connecticut Department of Education: Core Science Curriculum Framework Standards:**

**Grades PreK-2 Core Scientific Inquiry, Literacy and Numeracy**

- A INQ.1 Make observations and ask questions about objects, organisms and the environment.
- A INQ.4 Read, write, listen and speak about observations of the natural world.
- A INQ.6 Present information in words and drawings.
- A INQ.9 Count, order and sort objects by their properties.

**Grades 3-5 Core Scientific Inquiry, Literacy and Numeracy**

- B INQ.1 Make observations and ask questions about objects, organisms and the environment.
- B INQ.4 Employ simple equipment and measuring tools to gather data and extend the senses.
- B INQ.6 Analyze, critique and communicate investigations using words, graphs and drawings.
- B INQ.7 Read and write a variety of science-related fiction and nonfiction texts.

**K.2 - Many different kinds of living things inhabit the Earth.**

- A 5. Describe the similarities and differences in the appearance and behaviors of adults and their offspring.

**1.2 - Living things have different structures and behaviors that allow them to meet their basic needs.**

- A 14. Describe the structures that animals, including humans, use to move around.

**1.3 - Organisms change in form and behavior as part of their life cycles.**

- A 16. Describe the life cycles of organisms that grow but do not metamorphose.

**3.2 - Organisms can survive and reproduce only in environments that meet their basic needs.**

- B 4. Describe how different plants and animals are adapted to obtain air, water, food and protection in water habitats.

**4.2 - All organisms depend on the living and non-living features of the environment for survival.**

- B 11. Describe how natural phenomena and some human activities may cause changes to habitats and their inhabitants.

**6.2 - An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.**

- C 5. Explain how populations are affected by predator-prey relationships.
- C 6. Describe common food webs in different Connecticut ecosystems.